NORTHERN CALIFORNIA BOTANISTS

BOTANICAL LEAFLETS

ISSUE 22 **FALL 2018**

PRESIDENT'S MESSAGE

It is fall and hopefully everyone has finished their summer field work. This has been quite another unbelievable year with fires. Unfortunately, many friends have lost their homes in the north state due to the fires this summer. And I am sure we all know people who were affected by the fires in every part of California. It would be wonderful if we got more rain soon!

I was able to spend some time in Maryland at the end of July at the Native Orchid Conference. It was held at the Smithsonian Educational Research Station outside of Annapolis. We also visited the eastern shore and the northern parts of Maryland. I saw six native orchid species that were new to me which was exciting!

We are busy planning our 2019 Symposium which will be January 14 and 15, 2019 at California State University, Chico. See details within the newsletter about the symposium. We plan to have workshops on January 16, 2019 as well. It is really going to be a great event!

Have a great fall with your many vast botanical adventures. And hope to see you in January at the Symposium.

Linnea Hanson, President

NORTHERN CALIFORNIA BOTANISTS SYMPOSIUM! 14-15 JANUARY 2019—**REGISTRATION IS OPEN!**

The Northern California Botanists will host their 9th symposium at California State University, Chico, January 14-15, 2019 with optional workshops on the 16th. The 2019 Symposium is titled *Research and Conservation of Northern California's Vegetation Communities.*

See Page 2 for more information

MYSTERY PLANT

This diminutive plant forms dense rhizomatous mats in the intertidal zone of the San Francisco Bay Delta and colonizes mud flats, riprap, and old pilings. It has limited identifying characters to separate it from closely related species: it flowers and fruits rarely, and the leaf lacks a visible blade, it is derived from the axis of a compound leaf. One diagnostic feature is visible leaf crosswalls when held up to the light.

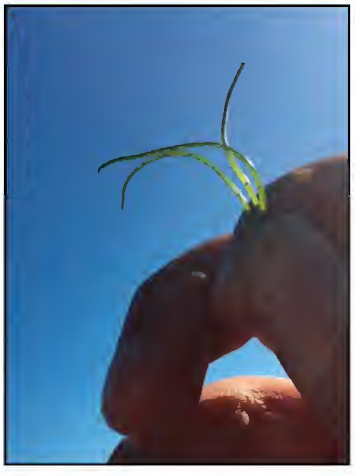


Photo by Jane Van Susteren

(Answer on Page 2)

INSIDE THIS ISSUE:

2019 NCB Symposium (Continued)

Research and Conservation of Northern California's Vegetation Communities will provide updates and perspectives on topics such as Sessions will include Vegetation Mapping and Monitoring; The Importance of Herbaria for Research, Management, and Conservation; Fire and Vegetation; Challenges and Solutions for Conserving Cryptic Diversity; Native Plant Conservation; New Discoveries; and Now Some Good News.

We will again have a Lightning Talks Session with 5-minute per talk. The Poster Session will be held on Tuesday morning.

Two optional workshops will follow on Wednesday and will include:

- Collecting and Preserving Herbarium Specimens
- New Calflora Tools for California Botanists and Plant Enthusiasts

The California Botanical Society will again host a Mixer on Sunday evening January 13, 2019 from 5:30-8:30 p.m. at Woodstock's Pizza in downtown Chico. Come to town early to join in on this fun social and networking event.

Visit our webpage at http://www.norcalbotanists.org for more information.

2019 Symposium Keynote Address—Todd Keeler-Wolf

The **2019 Symposium Keynote Speaker** will be **Todd Keeler-Wolf.** Todd is the lead vegetation ecologist in the California Department of Fish and Wildlife's Vegetation Classification and Mapping Program (VegCAMP). Todd has authored and co-authored books on Vegetation, Plant Communities, and Ecosystem inventory. He has worked all over California and also worked in South America, the Caribbean, the South Pacific, and Africa.

Todd grew up in Northern California, steeped in its nature and natural history. He will synthesize his understanding of some of the landscapes that he has gotten to know over the years: Oakland and the East Bay, the Klamath Mountains, North Coast Ranges, the Central Sierra, and the Modoc Plateau - describing his deepening understanding, interest, and shifting perspectives on each -- from the introductory, to the descriptive, and the analytical. He will conclude with a reflection on being a landscape ecologist in a time of rapid change.

The Keynote Address will follow the banquet on Monday evening, January 14, 2019 from 7:30—8:30 p.m.

Lightning Talks

This year we are again offering a 5-minutes per talk session. Consider giving a talk if you: are working on a project and want to give an update, are aware of an issue of concern or growing need in the botanical community, want to promote something exciting, need to hire people for an upcoming botanical project, have discovered something novel and interesting, know of new laws or regulations that the community should know about, or want to update about what your organization is doing. If you are interested in giving a lightning talk, contact jennyost@gmail.com by November 15th. Please see our website for more information.

Call for Posters

The NCB symposium planning committee invites you to bring a poster to share your work and knowledge of the biology, ecology, conservation and/or management of our Northern California plant life with other at the 2019 Symposium. This will be a great opportunity for continuing education and networking.

The first session on Tuesday morning, January 15 will be a dedicated poster session. Poster authors are requested to be present with posters during a portion of the session.

The deadline for submitting poster abstracts is December 14, 2018. Space is limited to 40 posters , so get yours in early.

Additional information can be found on the website at: www.norcalbotanists.org/symposia_callforposters.htm

Contact Barb Castro for more information at barbcastro@hotmail.com

See Page 9 for information of the Student Poster Contest!

Answer to "Mystery Plant": *Lilaeopsis masonii* Mathias & Constance (Apiaceae) - Mason's lilaeopsis

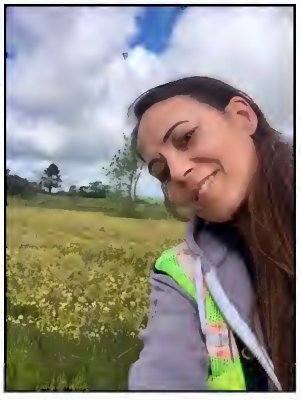
NORTHERN CALIFORNIA BOTANISTS IN ACTION

A continuing series that highlights well-known to possibly less-well-known botanists, with photographs from the present to several decades back. Please share unpublished pictures of northern California botanists: send jpegs and information to jane.vansusteren@gmail.com

Aaron Sims is the Rare Plant Botanist for CNPS, he leads the rare plant status review process and the CNPS *Inventory of Rare and Endangered Plants*. He received a degree in Ecology and Systematic Biology with an emphasis in Botany from Cal Poly, San Luis Obispo. Prior to employment with CNPS in 2010, Aaron worked in environmental consulting and as a biologist for California State Parks on the Central Coast, performing rare plant and vegetation surveys, prescribed fire management, and performing duties as a GIS analyst. Aaron also produced with the *Atlas of Sensitive Species of the Morro Bay Area* (2010) and the *Green Infrastructure Network of the Baywood Fine Sands Community* (2013) with the Morro Bay National Estuary Program, producing the *Atlas of Sensitive Species of the Morro Bay Area* (2010) and the *Green Infrastructure Network of the Baywood Fine Sands Community* (2013).

Dean William Taylor is a California old-school field botanist: 50 years of field experience; 22,000 collection numbers; ~5000 species, collections from all 58 counties and most western U.S. states. Dean has discovered 12 new species (three are commemorative 'taylorii'); most of his endeavors have been to visit and document CNPS rare plants in the field. His dissertation was on Sierra Nevada alpine botany (he studied under Jack Major and Ledyard Stebbins). He joined the California Native Plant Society in 1967 as a teenager, went on field trips, and became hooked. His instructions to newly minted botanists: collect vouchers, go to under-visited locations, go out early and late in the season (when one could assume nothing would be flowering). Don't assume everything is a known taxon – there are perhaps 1000 undescribed California endemics.

Sarah Ratay is a Preserve Steward for the Nature Conservancy in Southwest Oregon (California Floristic Province!). She conducts endangered plant monitoring, invasive plant mapping and removal, leads volunteer groups, and assists with vernal pool restoration via fill removal from historic pools, as well as monitoring of restoration success. She conducted her Master's degree work from UCLA on the Channel Islands of California, the picture is from helicopter-assisted steep-terrain fieldwork from Santa Cruz Island. Sarah is from Corning, California, conducted her undergrad at UC Davis, then moved south to work as the Plant Ecologist on Catalina Island. She was a former board member and newsletter editor of Southern California Botanists, but she is thrilled to be back botanizing in the spectacular Northland!



Eliza Shepard is a botanist at Garcia and Associates. She has led noxious weed control and eradication efforts on several national forests including the Eldorado, Stanilaus, and Sierra, and taken part in the large-scale Mojave Desert surveys for wind and solar farms. She also developed GIS field data collection technique for her company using ArcCollector. Much of her work involves California rare plant surveys, wetland delineations, and weed control efforts. She got her bachelor's degree from San Francisco State and then returned there for her master's. She earned her thesis from the Patterson lab on Local Rarity of Plant Species in Sonoma County, where she identified species at the edge of their distribution and botanical hotspots within her home county. She has deep roots in Sonoma county, but she has been lucky enough to work and botanize throughout California.

2018-2019 STUDENT RESEARCH SCHOLARSHIP AWARDS (CONT.)

Molly Vanderlip is an Undergraduate student at Cal Poly, San Luis Obispo. 136 words

The title of her research is **"Assessment of UV and visual pigmentation in *Erythrante bicolor*."**

Erythranthe bicolor has two visible color morphs that span an approximate 600-meter elevation gradient in the central Sierra Nevada: one morph is entirely yellow and another has bicolored petals. A previous study has shown that in sites where congener *Erythranthe guttata* coflowers with *E. bicolor*, the bicolor morph is more abundant, has more pollen deposition, and exhibits greater seed set than the all-yellow morph, consistent with pollinator mediated character displacement. However, this study did not examine UV flower color; which is what I am investigating. Preliminary data collected in 2017 shows that UV and visible flower color may negatively covary, with there being color displacement in both visible and UV spectrums. This study hopes to answer whether visible and UV flower color morphs negatively covary, whether there a geographic pattern of character displacement in UV flower color in the presence of a congener, and whether visible and UV flower color morphs can be predicted by elevation.

Maureen Page is a Ph.D. student at the University of California, Davis.

The title of her research is **"How does honey bee abundance affect the pollination and reproduction of native plants?"**

Many studies support the claim that introduced honey bees compete with native pollinators. Little is known about how honey bee introductions will affect native plant communities and plant species' persistence. Recent network analyses have suggested that introduced pollinators can affect native plant community dynamics through increasing connectance and decreasing modularity in pollination networks. However, it is difficult to infer how changes in connectance and network modularity will affect plant reproduction. To bridge this gap, I integrate network approaches with more traditional methods for measuring pollination function to investigate how honey bee abundance alters pollen transport networks as well as the pollination and reproduction of California native plants.

I conducted this work in the California Central Valley at 5 replicated study sites. I collected pollinators and surveyed visitation patterns over four sample rounds from April – May. In the lab, I counted and identified pollen grains carried on insect bodies. I measured single-visit pollen deposition by the most common insect visitors and total stigmatic pollen deposition for *Eschscholzia californica, Collinsia heterophylla, Phacelia californica,* and *Lupinus densiflorus*. I also measured seed set for *Eschscholzia californica, Collinsia heterophylla,* and *Lupinus densiflorus.* While I am still processing stigmas and insect specimens, preliminary analyses suggest that there was a negative effect of honey bee abundance on *Eschscholzia californica* seed set ($p < 0.001$) but no effect on seed set of *Lupinus densiflorus* or *Collinsia heterophylla* ($p > 0.05$).

I will use insect pollen loads and visitation frequencies to construct pollen transport networks, which map patterns of interaction between plants and pollinators. I will use these networks to analyze how network structure, pollen fidelity of native bees, and visitation patterns change along the gradient of honey bee abundance. From last year's data, it appears that bumblebees respond to increasing honey bee abundance by decreasing pollen fidelity while solitary bees respond by increasing pollen fidelity.

2018-2019 STUDENT RESEARCH SCHOLARSHIP AWARDS (CONT.)

Kelly Santos is an M.S. student at San Francisco State University.

The title of her research is **"The reproductive life history of endangered *Suaeda californica* and its use in sea level rise adaptation in San Francisco Bay."**

Over 90% of the salt marshes in the San Francisco Estuary (SFE) have been damaged or destroyed over the past century. As a result, some salt marsh plant species are now rare and will require active revegetation to insure both their presence and their functions. This includes the endangered California sea-blite, *Suaeda californica,* a succulent wetland shrub that occurs in a narrow high tide zone along sandy salt marsh edges or estuarine beaches. The original native SFE population was eliminated around 1960, largely through urban development and habitat loss. Propagules from Morro Bay were used to reintroduce *S. californica* to San Francisco Bay in the late-1990s, and roughly 30 total plants have survived until now.

As these low numbers hardly represent a restored population of *S. californica,* and the plants have only rarely self-recruited from seed, research is needed to understand the best methods to restore *S. californica* populations. Further, the large stature of this shrub and its propensity to grow in sandy, higher wave energy areas suggest that successfully restoring it might have multiple benefits to wetland habitat adaptation to climate change and sea level rise.

The objectives of this project are to 1) determine the effects of abiotic conditions, including freshwater availability and organic matter, on the germination and growth of *S. californica*; and 2) evaluate the efficacy of "arbors" (various configurations of wooden branches as support) to enhance height growth of *S. californica*, which might further encourage sediment accumulation and high tide refuge. Understanding factors that promote *S. californica* reproduction, germination, and growth will inform the maintenance of SF Bay salt marshes and the habitat they provide, while also assisting in the recovery of an endangered species. In doing so, this project will help preserve California's diminishing wetland habitats and help adapt to climate change and sea level rise.

Ian Mounts is an M.S. student at California State University, Sacramento.

The title of his research is **"The role of common mycorrhizal networks in ameliorating drought stress in *Pseudotsuga menziesii*."**

Common mycorrhizal networks (CMN) are assemblages of mycorrhizal fungi that associate with multiple plant partners simultaneously. These networks are capable of transporting water from established nurse trees to establishing receiver seedlings. Transported water contributes to the continued functioning and recovery of fine roots, extramatrical hyphae, and surrounding plant community under drought conditions. It is currently unknown if transported water is capable of directly reducing drought stress in plants connected in a CMN. I propose to test the hypotheses that: 1) Plants connected via a CMN will experience reduced drought stress compared to plants that are not connected to the network, and 2) Plants connected via a CMN will experience increased photosynthetic capacity compared to plants that are not connected to the network.

These hypotheses are being tested in mesocosms, each of which contains four outer chambers to house receiver seedlings, and a central chamber to house a nurse tree. Layers of stainless-steel mesh have been installed between each outer chamber and the central chamber to apply one of four treatments designed to exclude a major potential pathway of water movement. A layering scheme of fine/coarse/fine will be used for the Mycorrhizal Only Pathway and the No Pathway treatments, and a single sheet of fine mesh will be used for the Mycorrhizal+Soil Pathway and the Soil Only Pathway.

2018-2019 STUDENT RESEARCH SCHOLARSHIP AWARDS (CONT.)

Israel Borokini is a PhD student at the University of Nevada, Reno.

The title of his research is **"Species distribution and abundance models for *Ivesia webberi* A. Gray in the Great Basin Desert, Western U.S."**

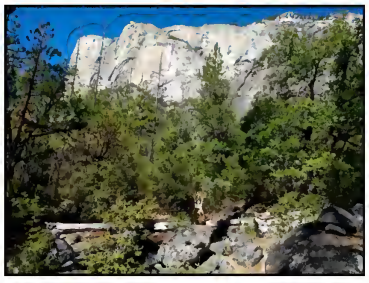
Israel Borokini on left

Species distribution models are often fitted to identify environmental factors that predict species occurrence, map species spatial distributions, and earmark areas for conservation. This is based on predictions that species' ecological niche and distribution in time and space are determined by movement, biotic, and abiotic factors. Species do not saturate their habitat range, but occupy a part, termed the realized niche. This true for most western North American neo-endemics because the species are phylogenetically young and have insufficient time to colonize their entire range.

However, fitting SDMs for species with few occurrence points is very challenging, due to statistical artefacts of modeling algorithms, which can lead to prediction uncertainty and model over-fitting. To overcome this in this study, different statistical algorithms will be used comparatively and in ensembles. Individuals of a species are clustered in populations, but the census size of each population plays critical role in the persistence of the population and the species. Ecological theory, metapopulation theory, and population genetic theory predict that small and isolated populations have higher vulnerability to extirpation. Therefore, effective conservation of a rare species involves population abundance estimation for monitoring, viability analysis, and species conservation ranking, among others.

Moreover, intensive field surveys on a species population abundance can be complemented by fitting species abundance models to identify environmental factors that support the species' colonization and persistence. In these two related studies, I am interested in identifying what ecological factors define the ecological niche, spatial distribution and abundance of *Ivesia webberi* populations within its range. Additionally, I will investigate and recommend the best statistical algorithms for fitting SDMs by comparing between different regression, Bayesian and machine learning statistical algorithms and ensemble models. These studies are part of my five-chapter PhD dissertation.

Lisa Rosenthal is Ph.D. student at the University of California, Davis.



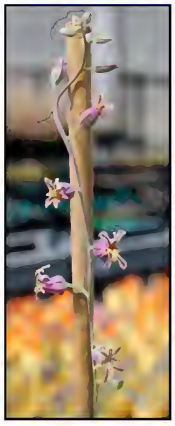
The title of her research is **"Interactions among historic land management, drought, native pathogens, and insects on tree mortality in the mixed conifer forests of Yosemite Valley."**

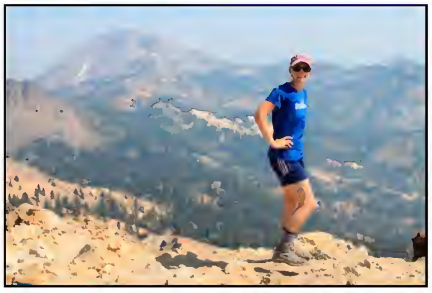
Gap phase dynamics, or the opening and closing of canopy gaps through localized tree mortality and subsequent regrowth, is an integral component of forest dynamics. The importance of pathogens and pests in the creation of canopy gaps has often been overlooked despite more detailed investigations noting their impact. To quantitatively assess how pathogens and pests influence gap dynamics, this study examines gaps in Yosemite Valley, where both severe drought conditions and substantial vegetative changes as a result of historic management practices have occurred. We have previously assessed the diverse causes of tree mortality in forest canopy gaps through repeated surveys of belt transects (1999, 2004 and 2011). Aerial photographs of transect areas taken in 1972 provide information on the long-term gap dynamics. Resurveys of the transects this year will help us understand how extended drought in recent years has affected pathogens and pests and their contribution to tree mortality. This study leverages nearly five decades of past research to provide rare insight into the long-term consequences of management decisions and the cascading effects on pathogens and pests, tree mortality, and the interactions with climate change. Information from this study will be useful for designing successful vegetation management plans in Yosemite Valley and for forest managers beyond the Sierra Nevada range, where similar pathogens and pests naturally occur.

2018-2019 STUDENT RESEARCH SCHOLARSHIP AWARDS (CONT.)

Elena Suglia is a Ph.D. student at the University of California, Davis.

Shasta Chapter award winner



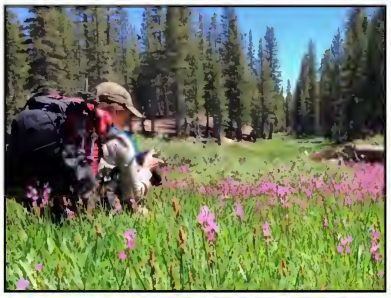


The title of her research is **"The Impact of Snowmelt on Phenology and Population Genetics of *Streptanthus tortuosus*."**

Scientists understand that climate change has already produced marked changes in plant phenology globally, which has been shown to affect species interactions, community structure, and patterns of biodiversity. However, less is known about the effects of phenological changes on population genetics. When populations reproduce in different places or at different times, these disparities in phenology can reduce gene flow, causing genetic divergence and changing overall population genetic structure, and influence the potential for evolutionary response to change. This study seeks to understand the effects of snowmelt patterns on flowering timing, local adaptation, and gene flow in the native California plant, *Streptanthus tortuosus*, in order to evaluate its potential to persist under novel abiotic conditions due to climate change. In 2017 and 2018, I collected data on snowmelt timing and temperature as well as metrics on plant phenology and fitness for 10 mountain populations of *S. tortuosus* at Lassen Volcanic National Park in order to understand the role of temperature and snowmelt on phenology and the subsequent consequences for the future of adaptation, population persistence, and geographic distributions under further climate change.

To my knowledge, my overall research project, which combines observational, genetic, and field manipulative experiments, represents the first rigorous test of the indirect effects of snowmelt timing on population genetics by influencing plant phenology. The results of this research will have broad applications relevant not only to plant ecologists, but also to all biologists studying the adaptation and persistence of organisms in variable environments.

Devon Picklum is a Ph.D. student at the University of Nevada, Reno.

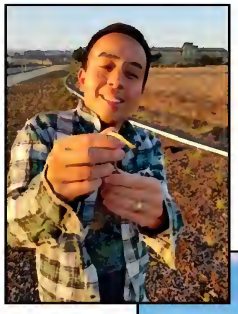


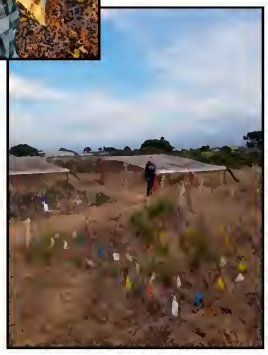
The title of her research is **"Measuring floral display traits of *Bombus* pollinated *Dodecatheon alpinum* and *Pedicularis groenlandica* in the Sierra Nevada".**

Pollinators provide reproductive services to flowering plants by carrying pollen between individuals while collecting nutritional resources in the form of nectar or pollen. Pollinators learn about flower color, shape, and scent when foraging for resources, and use these floral cues when making foraging decisions. In diverse flowering communities, a bee's ability to distinguish between different species has direct consequences for plant fitness, as hetero-specific pollen transfer represents cost in both lost male fitness and may prevent subsequent pollination. Here, we investigate the reproductive biology of two flowering species with multimodal similarity. *Dodecatheon alpinum* (alt. *Primula tetrandra,* Alpine shooting star) and *Pedicularis groenlandica* (Elephant head lousewort) share similar color, pollen reward, specific behavioral requirements (buzz pollination), habitat preference, and are both predominately visited by *Bombus* species. In order to understand these similar traits from the pollinator's perspective, we use a model of bumblebee color vision to both quantify floral color similarity in *D. alpinum* and *P. groenlandica* in a community context, and to understand how these two species will look from a bee's eye at different foraging realistic distances. We further characterize floral volatiles from these species and demonstrate that *D. alpinum* and *P. groenlandica* vary in the types of floral scents they produce. This approach takes pollinator sensory systems into account to quantify biologically relevant multimodal floral similarity in this system and set the groundwork for further understanding the evolution of floral traits.

2018-2019 STUDENT RESEARCH SCHOLARSHIP AWARDS

Justin Luong is a Ph.D. student at the University of California, Santa Cruz.





The title of his research is **"Can plant functional traits explain impacts of varying water on restoration outcomes?"**

Restoration is riddled with unpredictable outcomes especially in a changing climate in which the extremity of droughts is likely to increase. This is compounded by a narrow focus on taxonomic composition with little consideration of functional traits. At a coastal prairie at Younger Lagoon Reserve, Santa Cruz, CA – I will determine whether drought related functional traits of native and non-native species such as specific leaf area, leaf thickness, leaf carbon and nitrogen content, and leaf $\delta^{13}C$ can explain the survival and growth of planted native plants. Twelve native species were planted in treatment types: shelter (60% natural rainfall reduction), control, and water addition (1/gal per week during the growing season the first year). I predict that the planted seedlings that survive to 2019 will have functional traits (such as low specific leaf area, high leaf thickness, high vein length per unit area and low water use efficiency) that confer greater survival and growth under the drought compared to control treatment. Thus far, results have shown that planted native species are adapted to drought. Certain native species such as *Sidalcea malviflora*, *Stipa pulchra* and *Achillea millefolium* were found to perform better in shelter plots, while *Eschscholzia californica* was found to have a poorer response in shelter plots. Experimental treatments have also been observed to cause distinct changes plant community composition.

Max Odland is an M.S. student at the University of California, Davis.

The title of his research is **"Effects of Repeated Prescribed Fire and Thinning on Understory Diversity in Sierra Nevada Mixed Conifer Forests."**

Fire is a critical ecological process that drives forest structure and biodiversity in the Sierra Nevada. However, fire suppression has significantly Fire is a critical ecological process that drives forest structure and biodiversity in the Sierra Nevada. However, fire suppression has significantly impacted natural disturbance regimes in these forests. As forest managers attempt to reintroduce historic fire regimes, it is increasingly important to understand the effects of different management and restoration techniques. This study compares understory diversity and resource heterogeneity under different management strategies in a mixed conifer forest at the Teakettle Experimental Forest (TEF) to mixed conifer forest stands with active fire regimes in Kings Canyon and Yosemite National Parks.

TEF follows changing understory conditions for 18 years after a full-factorial design of thinning and burning treatments. Reentry burns were completed in fall 2017, emulating the historic fire return interval at the site. Plots within Kings Canyon and Yosemite share similar topographic, edaphic, and mixed-conifer conditions to TEF, and have experienced 3-5 low-intensity fires within the last 60 years. Understory cover for each plant species, and additional environmental variables (soil moisture content, slope, aspect, rock cover, bare ground, and woody debris cover) will be measured at 10m2 gridpoints within each plot.

I predict that 1) reference plots with active fire regimes will have higher understory plant diversity and environmental heterogeneity than control plots and most treatment combinations; 2) repeated prescribed burns with an initial mechanical thinning will produce similar conditions to the reference plots, due to the higher understory diversity produced in these plots after a single burn treatment; and 3) heterogeneity of environmental variables, especially soil moisture and light availability, will be associated with greater understory plant diversity. The results of this study will help inform the application of prescribed fire for forest restoration and plant diversity conservation in the Sierra Nevada.

Student Poster Contest

ATTENTION STUDENTS!

Northern California Botanists will be holding a contest for the best student poster presentations. Participating student posters will be evaluated by a panel of judges during the Poster Session on the second day of the Symposium.

Three cash awards will be given to the top ranked posters ($100, $75, $50). Winners will be announced at the Symposium and featured in an issue of the Northern California Botanists Newsletter.

Students, come present a poster to highlight your research and compete for this award!

For more information on the Poster Session, please visit the "Call for Posters" webpage at http://www.norcalbotanists.org/sympsia/sympsium2019_call-for-posters.htm

2019 Symposium Sponsorship

Please help make the 2019 Symposium a success!

NCB invites sponsorship for our 9th symposium. Your help is important and allows us to keep our registration rates low, support student attendance, and keep our programs moving forward.

All sponsors of $100 or more will receive recognition in the symposium program, on our website, and in our newsletter. Sponsorships of $200 or more receive additional benefits including an Exhibitor Booth space.

If you or your company would like to partner with us in this event or if you have questions about sponsorship, you may contact us at ncbotanists@gmail.com or visit our website at www.norcalbotanists.org.

Thank you to all who have sponsored in the past and those that have already pledged support for the 2019 Symposium.

Stipends ($200) for College Students Attending the 2019 Symposium

Northern California Botanists will provide a number of $200 stipends to help cover expenses of travel, lodging, meals, and registration for current college students who wish to attend the NCB symposium in January 2019. Butte College and CSU Chico students are also encouraged to apply; NCB will provide registration refunds to a number of local area students.

More information and the application form can be found on our webpage. Once verified, awards are given on a first-come basis. Get your applications in early!

For questions, please contact Daria Snider at dsnider@madroneeco.com. Applications must be received by December 2, 2018 and should be emailed to Daria Snider. Applicants awarded stipends will be notified by email in late December. The check for $200 can be picked up at the registration desk at the conference in January.

Requirements:

1) Must be a current college student; 2) Must provide evidence on application form of interest or involvement in plant sciences, and 3) Must register for the NCB symposium by 14 December 20168

2019-2020 Student Research Scholarship Awards

Northern California Botanists provides competitive botany and plant ecology research scholarships to undergraduate and graduate students who are studying botany and/or plant ecology.

Applications for the 2019-2020 school year will be posted on our website in November and are due in March.

A flyer will also be available for posting. Please help get the word out by letting botany and plant ecology students and faculty know of this opportunity.

NORTHERN CALIFORNIA
BOTANISTS

P. O. Box 8042
Chico, CA 95927-8042

Save the Date!
NCB 2019 Symposium
January 14-15, 2019
Chico, California
Registration is Open!

Please send address changes to:

ncbotanists@gmail.com

MEMBERSHIP APPLICATION/RENEWAL

Name: _____

Affiliation: _____

Address: _____

City:_____State:_____ Zip:_____

Email:_____

MEMBERSHIP DUES:

_____ Individual $25.00 _____ Student/Limited Income $15.00

_____ Family or Small Business/Non-Profit (two memberships) $40.00

In addition, I would like to donate $_____ to Northern California Botanists to help fund NCB programs and student research scholarships.

Make checks payable to "Northern California Botanists" and mail to:

Northern California Botanists
P. O. Box 8042
Chico, CA 95927-8042

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